

We developed a protocol to survey northern harriers (*Circus cyaneus*) and associated raptors in strip-mine and agricultural habitats of northcentral and northwestern Pennsylvania. Our primary objective was to compare the relative abundance of harriers and associated raptors in the two habitat types and geographical regions. Relative abundance of harriers and other raptors using strip-mine and agricultural habitats is important to determine how these species respond to different types of human-altered environments. We selected 20 survey routes (i.e., a network of roads); 10 per geographical region and habitat type. We conducted one survey per month during January and February 1993 on each route, giving 40 total surveys per winter. We conducted surveys for breeding raptors on each route twice per month in April, May, and June, yielding 120 surveys per breeding season. A survey consisted of driving the route in a vehicle and stopping at 0.8 km intervals for 5 min to survey the available habitat. We observed northern harriers, red-tailed hawks (*Buteo jamaicensis*), rough-legged hawks (*Buteo lagopus*), American kestrels (*Falco sparverius*), and Cooper's hawks (*Accipiter cooperii*) in both habitat types and geographical regions. During winter surveys we observed 0.41 and 0.83 raptors per hour in strip-mine and agricultural habitats, respectively. During breeding raptor surveys we observed 1.23 and 1.50 raptors per hour in strip-mine and agricultural habitats, respectively.

#### QUANTIFICATION OF MILITARY NOISE IN BALD EAGLE HABITAT AT ABERDEEN PROVING GROUND, MARYLAND

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As the U.S. Army trains to be ready to meet the challenges of the future it must maximize the use of installation resources. This use will create high levels of noise that may affect wildlife. In assessing the potential impact of activities, the effects of noise on wildlife have become a frequent topic during the public participation process. The bald eagle (*Haliaeetus leucocephalus*) has been a continuous resident and visitor to Aberdeen Proving Ground. Today there are 10 active nest sites and several roost areas on the installation. From the large numbers of the bald eagle it would appear that the impulsive noise from large caliber weapons firing and other military related noise have no effect. To examine this circumstances we quantified the noise environment at two nest and two roost sites over a one-year period. In this way the noise levels bald eagles are exposed to, and appear to tolerate, will be documented. The preliminary results show A-weighted equivalent sound levels of 59.0 to 61.3 and C-weighted peak levels of 79.3 to 131.5. These levels indicate these sites are subject to many military noise events. Yet this bald eagle habitat remains active and productive. This data provides an indication potential noise impacts from military noise.

#### PEREGRINES, POWER PLANTS, AND MIGRATION ROUTES

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In Wisconsin, peregrine falcons (*Falco peregrinus*) traditionally migrate along two corridors, the Mississippi River and the western shore of Lake Michigan. Historically, peregrine falcons also nested along the Mississippi River. Because of habitat changes and predation, peregrines have not successfully reoccupied their historic nest sites along the river. However, along the western shore of Lake Michigan, a plan was developed and carried out which utilized man-made structures such as power plants as nest box sites. These sites are all in urban areas and have proven to be suitable for peregrines to nest. Because of their placement and relatively open spaces around these nest boxes, nesting peregrines have been able to defend themselves and their young from avian predators. With power plants strategically located along both migration routes and the safety provided by placing nest boxes on the tall generating stations or smokestacks, these historic migration routes may now become the stronghold for nesting peregrines in Wisconsin and elsewhere in the Midwest.

#### ASSOCIATION ANALYSIS OF RAPTORS IN A FARMING LANDSCAPE

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We developed an extensive sampling program for raptors in the farming landscape of the Sacramento Valley, California. By March, 1993, after 41 mo and 89 surveys along a 200-km road transect, we mapped 4045 observations of 11 species of Accipitridae, 1470 of three species of Falconidae and 902 of *Cathartes aura*. With each observation, we recorded activity or perch used, and association with landscape elements and other species. We are conducting association analyses by using a geographic information system to overlay raptor observation maps with temporally dynamic maps of land-use, cultural practices, potential perches, and roadside vegetation. Pooled observations of Accipitridae demonstrate a strong migratory cycle and aggregation in the landscape. They most strongly select alfalfa fields, then riparian, wetland and upland habitats, irrigated pasture, dry pasture, and rice stubble. They avoid human settlements and most grain and row crops. All raptors avoid artificial hawk perches (narrow dowel on thin pole). Accipitridae prefer oaks, cottonwoods, elms, willows and telephone poles with multiple horizontal beams. The associations we are identifying will help agriculturists develop effective strategies for increasing rap-